

Up to PL e of EN ISO 13849-1 P2HZ X4P



Two-hand control unit for press controllers and safety circuits

Approvals

	P2HZ X4P
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Unit features

- ▶ Positive-guided relay outputs:
 - 3 safety contacts (N/O), instantaneous
 - 1 auxiliary contact (N/C), instantaneous
- ▶ Connection options for:
 - 2 operator elements (buttons)
- ▶ LED indicator for:
 - Switch status channel 1/2
 - Supply voltage
- ▶ Plug-in connection terminals (either spring-loaded terminal or screw terminal)
- ▶ See order reference for unit types

Unit description

The two-hand control relay meets the requirements of EN 574 Type IIIC. It forces the operator to keep his hands outside the danger zone area during the hazardous movement. The unit is suitable for use on controllers for metalworking presses as a component for simultaneous switching.

It can be used in applications with

- ▶ Mechanical presses (EN 692)
- ▶ Hydraulic presses (EN 693)

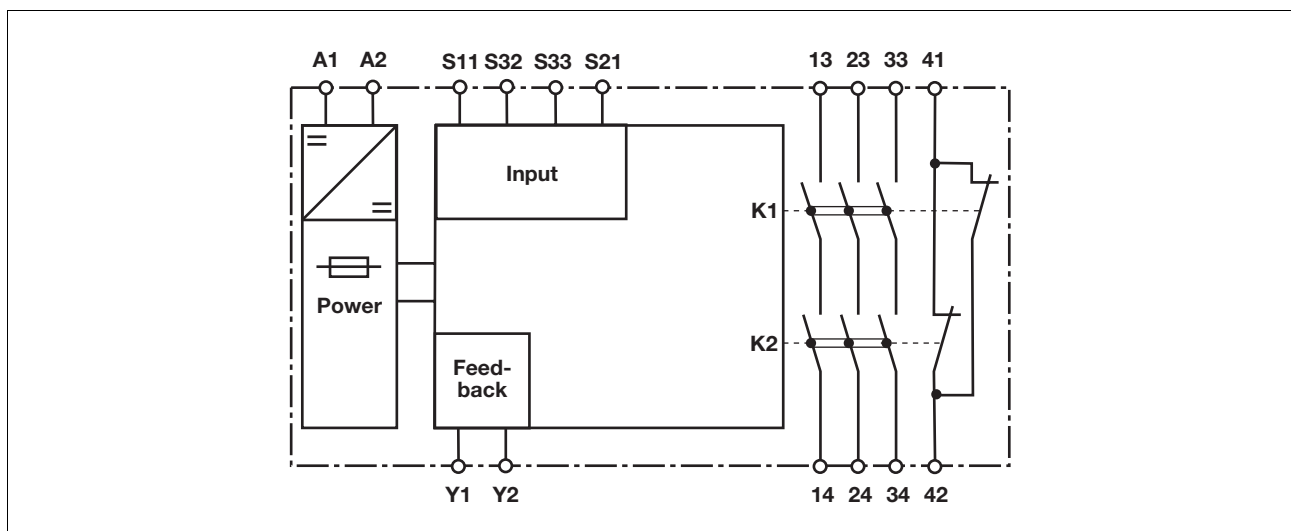
- ▶ Safety circuits in accordance with EN 60204-1

Safety features

The two-hand control relay meets the following safety requirements:

- ▶ The circuit is redundant with built-in self-monitoring
- ▶ The safety function remains effective in the case of a component failure
- ▶ The circuit prevents a further press stroke in the case of:
 - Relay failure
 - Contact welding
 - Coil defect on a relay
 - Open circuit
 - Short circuit

Block diagram



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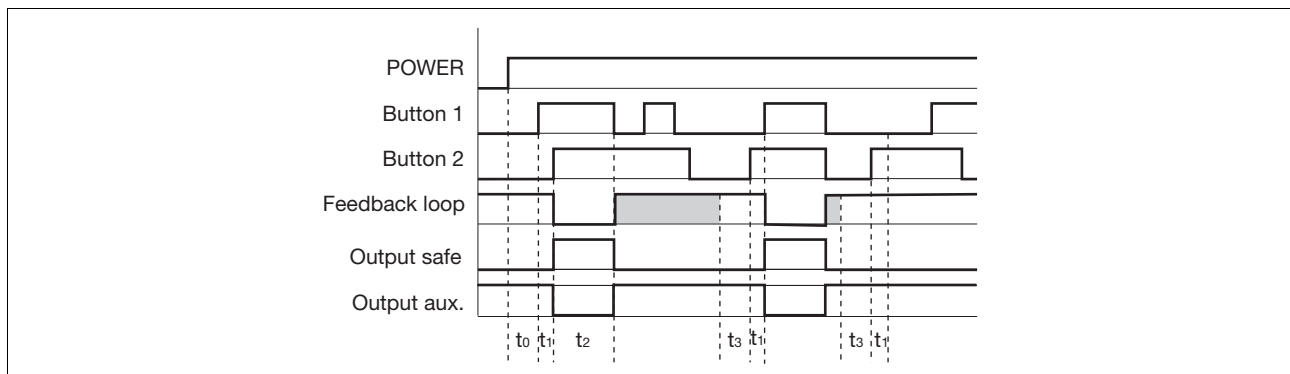
Function description

- ▶ The two-hand control relay must be activated by simultaneously pressing two buttons within **500 ms**. If

one or both of the buttons are released, the unit interrupts the control command for the hazardous movement.

- ▶ Reactivation: The output relays will not re-energise until both operator elements have been released and then re-operated simultaneously.

Timing diagram



Key

- ▶ POWER: Supply voltage
 - ▶ Button 1/Button 2: Input circuits S11, S21, S32, S33
 - ▶ Feedback loop: Feedback loop Y1-Y2
 - ▶ Output safe: Safety outputs 13-14, 23-24, 33-34
 - ▶ Output aux: Auxiliary contacts 41-42
 - ▶ t_0 : Recovery time after power on
 - ▶ t_1 : Simultaneity, channel 1 and 2
 - ▶ t_2 : Operating cycle ended through button 1 or 2
 - ▶ t_3 : Y1-Y2 must be closed before before the button is operated (recovery time)
- Shaded area: Status irrelevant

Wiring

Please note:

- ▶ Information given in the "Technical details" must be followed.
- ▶ Outputs 13-14, 23-24, 33-34 are safety contacts, output 41-42 is an auxiliary contact (e.g. for display).
- ▶ To prevent contact welding, a fuse should be connected before the output contacts (see technical details).
- ▶ Calculation of the max. cable runs I_{max} in the input circuit:

$$I_{max} = \frac{R_{lmax}}{R_l / km}$$

R_{lmax} = max. overall cable resistance (see technical details)

R_l / km = cable resistance/km

- ▶ Use copper wire that can withstand 60/75 °C.
- ▶ Sufficient fuse protection must be provided on all output contacts with capacitive and inductive loads.

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Preparing for operation

▶ Supply voltage

Supply voltage	AC	DC

▶ Input circuit

Input circuit	Single-channel	Dual-channel
Two-hand button with detection of shorts across contacts		

▶ Feedback loop

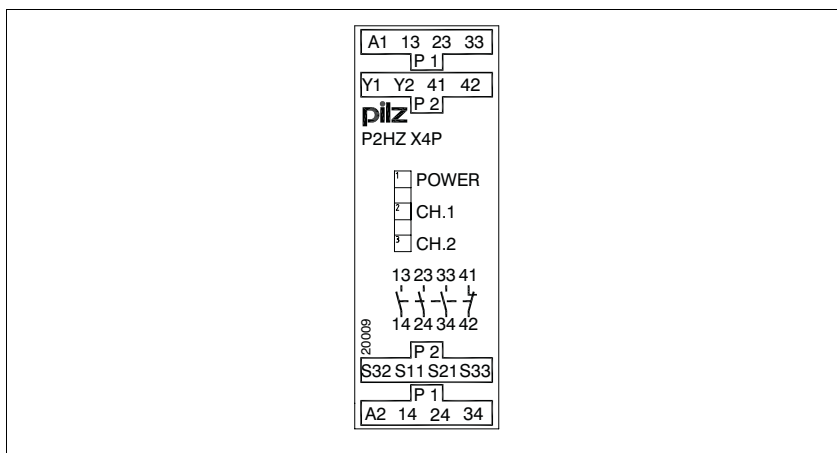
Feedback loop	
Contacts from external contactors	

▶ Key

S1/S2	Two-hand button
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Terminal configuration



Installation

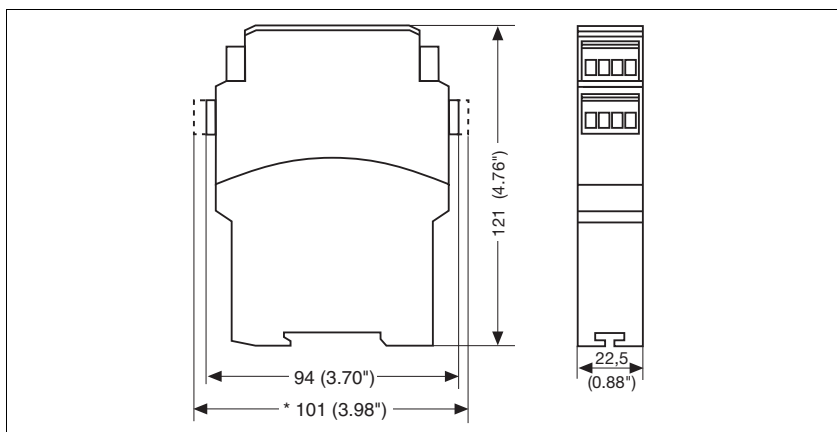
- ▶ The safety relay should be installed in a control cabinet with a protection type of at least IP54.
- ▶ Use the notch on the rear of the unit to attach it to a DIN rail.
- ▶ Ensure the unit is mounted securely on a vertical DIN rail (35 mm) by using a fixing element (e.g. retaining bracket or an end angle).

Notice

The distance of the button connected to the two-hand relay from the nearest danger zone must be large enough that if one of the buttons is released, the dangerous moment is interrupted before the operator can reach into the danger zone (see EN 999 "The positioning of protective equipment in respect of approach speeds of parts of the human body").

Dimensions

* with spring-loaded terminals

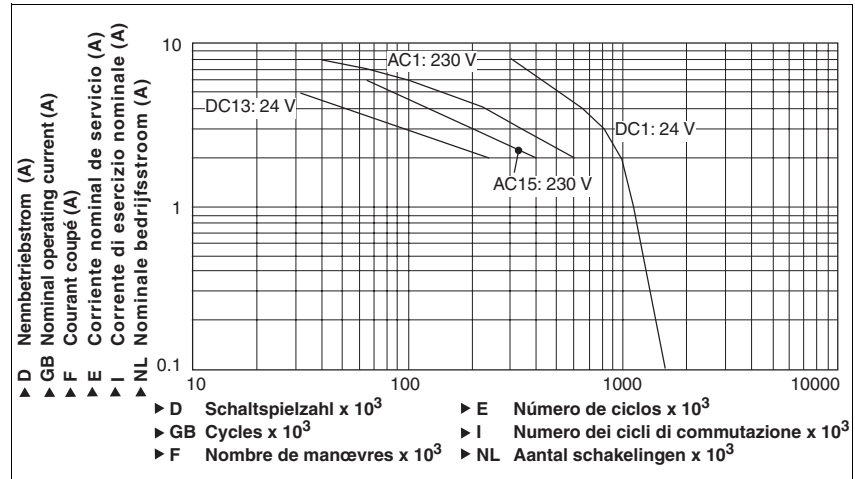


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Notice

This data sheet is only intended for use during configuration. For installation and operation, please refer to the operating instructions supplied with the unit.

Service life graph



Technical details

Electrical data

Supply voltage	
Supply voltage U _B AC	24 V
Supply voltage U _B DC	24 V
Voltage tolerance	-15 %/+10 %
Power consumption at U _B AC	4.0 VA Order no.: 777354, 787354
Power consumption at U _B DC	2.5 W Order no.: 777355, 787355
Frequency range AC	50 - 60 Hz
Residual ripple DC	10 %
Voltage and current at	
Input circuit DC: 24.0 V	
N/O contact	15 mA
N/C contact	20 mA Order no.: 777355, 787355
	25 mA Order no.: 777354, 787354
Feedback loop DC: 24.0 V	25.0 mA Order no.: 777354, 787354
	30.0 mA Order no.: 777355, 787355
Number of output contacts	
Safety contacts (S) instantaneous:	3
Auxiliary contacts (N/C):	1
Utilisation category in accordance with EN 60947-4-1	
Safety contacts: AC1 at 240 V	I _{min} : 0.01 A , I _{max} : 5.0 A P _{max} : 1250 VA
Safety contacts: DC1 at 24 V	I _{min} : 0.01 A , I _{max} : 5.0 A P _{max} : 125 W
Auxiliary contacts: AC1 at 240 V	I _{min} : 0.01 A , I _{max} : 2.5 A P _{max} : 600 VA
Auxiliary contacts: DC1 at 24 V	I _{min} : 0.01 A , I _{max} : 2.5 A P _{max} : 60 W
Utilisation category in accordance with EN 60947-5-1	
Safety contacts: AC15 at 230 V	I _{max} : 2.5 A
Safety contacts: DC13 at 24 V (6 cycles/min)	I _{max} : 1.5 A
Auxiliary contacts: AC15 at 230 V	I _{max} : 2.5 A
Auxiliary contacts: DC13 at 24 V (6 cycles/min)	I _{max} : 1.5 A
Contact material	AgSnO2 + 0.2 µm Au

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Electrical data	
External contact fuse protection ($I_k = 1 \text{ kA}$) to EN 60947-5-1	
Blow-out fuse, quick	
Safety contacts:	6 A
Auxiliary contacts:	4 A
Blow-out fuse, slow	
Safety contacts:	4 A
Auxiliary contacts:	2 A
Circuit breaker 24 VAC/DC, characteristic B/C	
Safety contacts:	4 A
Auxiliary contacts:	2 A
Max. overall cable resistance R_{lmax} per input circuit	14 Ohm
Safety-related characteristic data	
PL in accordance with EN ISO 13849-1	PL e (Cat. 4)
Category in accordance with EN 954-1	Cat. 4
SIL CL in accordance with EN IEC 62061	SIL CL 3
PFH in accordance with EN IEC 62061	1.06E-09
SIL in accordance with IEC 61511	SIL 3
PFD in accordance with IEC 61511	1.84E-06
t_M in years	20
Times	
Delay-on de-energisation (reaction time in accordance with EN 574)	
N/O contact	15 ms
N/C contact	30 ms
Recovery time	250 ms
Simultaneity, channel 1 and 2	500 ms
Environmental data	
EMC	EN 60947-5-1, EN 61000-6-2
Vibration to EN 60068-2-6	
Frequency	10 - 55 Hz
Amplitude	0.35 mm
Climatic suitability	EN 60068-2-78
Airgap creepage in accordance with VDE 0110-1	
Pollution degree	2
Overvoltage category	III
Ambient temperature	-25 - 55 °C
Storage temperature	-25 - 85 °C
Protection type	
Mounting (e.g. cabinet)	IP54
Housing	IP40
Terminals	IP20
Mechanical data	
Housing material	
Housing	PPO UL 94 V0
Front	ABS UL 94 V0
Cross section of external conductors with screw terminals	
1 core flexible	0.25 - 2.50 mm², 24 - 12 AWG Order no.: 777354, 777355
2 core, same cross section, flexible:	
with crimp connectors, without insulating sleeve	0.25 - 1.00 mm², 24 - 16 AWG Order no.: 777354, 777355
without crimp connectors or with TWIN crimp connectors	0.20 - 1.50 mm², 24 - 16 AWG Order no.: 777354, 777355
Torque setting with screw terminals	0.50 Nm Order no.: 777354, 777355
Cross section of external conductors with spring-loaded terminals: Flexible with/without crimp connectors	
	0.20 - 1.50 mm², 24 - 16 AWG Order no.: 787354, 787355
Spring-loaded terminals: Terminal points per connection	2 Order no.: 787354, 787355
Stripping length	8 mm Order no.: 787354, 787355

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Mechanical data

Dimensions	
Height	101.0 mm Order no.: 787354, 787355 94.0 mm Order no.: 777354, 777355
Width	22.5 mm
Depth	121.0 mm
Weight	
	215 g Order no.: 787354, 787355 220 g Order no.: 777354, 777355

The standards current on **08/03** apply.

Order reference

Type	Features	Terminals	Order no.
P2HZ X4P C	24 VAC	Spring-loaded terminals	787 354
P2HZ X4P	24 VAC	Screw terminals	777 354
P2HZ X4P C	24 VDC	Spring-loaded terminals	787 355
P2HZ X4P	24 VDC	Screw terminals	777 355